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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,682	10/18/2003	Le Li	KOI-03-01	9346
24295	7590	09/09/2005	EXAMINER	
Rodney T. Hodgson, Ph.D. 822 Pines Bridge Rd. Ossining, NY 10562			RAHLL, JERRY T	
			ART UNIT	PAPER NUMBER
			2874	
DATE MAILED: 09/09/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/687,682

Applicant(s)

LI ET AL.

Examiner

Jerry T. Rahl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-150 is/are pending in the application.
- 4a) Of the above claim(s) 40-150 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-14, 17, 18, 20-25, 32-35 and 37-39 is/are rejected.
- 7) ☒ Claim(s) 2-4, 12, 15-16, 19, 26-28, 30-31, 36 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

1. The drawings submitted have been reviewed and determined to facilitate understanding of the invention. The drawings are accepted as submitted.

Claim Objections

2. Claims 2-4 and 12 are objected to because of the following informalities: Claim 12 refers to, "liquid crystal," while all of the other claims refer to, "liquid crystal material." For examination purposes, "liquid crystal," will be considered to be equivalent to, "liquid crystal material." Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1-3, 5-6, 8-9, 11-12, 24-25 and 37-38 are rejected under 35 U.S.C. 102(a) as being anticipated by U.S. Patent No. 6,424,755 to Clapp.
5. Clapp describes an apparatus having a waveguide switching element (10) with a waveguide substrate (30), a planar waveguide (32) attached to the substrate, and a liquid crystal material (26) in operative contact with the waveguide and attached to the waveguide substrate, where the liquid crystal material has a first state where its index of refraction matches the index of refraction of the waveguide and has a second state where its index of refraction does not match the index of refraction of the waveguide (see Column 5). Clapp further describes a pair of

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electrodes (45a-d) in electric contact with the liquid crystal material for applying an electric field across the material where the liquid crystal material switches between the first and second states as the electric field is applied. Clapp further describes a beam of light of any polarization propagating in the waveguide is not reflected when the liquid crystal material is in the first state, but is reflected when the liquid crystal material is in the second state (see further Figures 1 and 4 and Column 2-5).

6. Further, Clapp describes the first state of the liquid crystal material as an isotropic state and the second state of the liquid crystal as a nematic state (see Column 5).

7. Further, Clapp describes the liquid crystal material in a trench (36) that intersects the waveguide.

8. Further, Clapp describes the electrodes as in-plane switching electrodes at the top of the liquid crystal material that switch the liquid crystal material in plane.

9. Further, Clapp describes the waveguide having a curved path (see Figure 5).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

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the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 1, 4-10, 13-14, 17-18, 20-22, 23-24, 29, 32-35, 37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clapp as applied to claims 1 and 24 above, and further in view of U.S. Patent No. 6,559,921 to Leslie et al.

13. Leslie et al. describes an apparatus having a waveguide switching element with a waveguide substrate (110), a planar waveguide (32) attached to the substrate, and a liquid crystal material (160) in operative contact with the waveguide and attached to the waveguide substrate, where the liquid crystal material has a first state where its index of refraction matches the index of refraction of the waveguide and has a second state where its index of refraction does not match the index of refraction of the waveguide (Columns 4-5). Leslie et al. further describes a pair of Indium-Tin-Oxide electrodes (120, 170) in electric contact with the liquid crystal material for applying an electric field across the material where the liquid crystal material switches between the first and second states as the electric field is applied. Leslie et al. further describes a beam of light propagating in the waveguide is not reflected when the liquid crystal material is in the first state, but is reflected via total internal reflection when the liquid crystal material is in the second state (see further Figures 2-8 and Columns 3-5).

14. Further, Leslie et al. describes the first and second states of the liquid crystal as nematic states (see Figures 3A-3B).

15. Further, Leslie et al. describes the liquid crystal material in a trench (135) that intersects the waveguide.

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16. Further, Leslie et al. describes the trench as intersecting the waveguide at an angle greater than the angle for total internal reflection when the liquid crystal material is in the second state (Column 3 Lines 10-15).

17. Further, Leslie et al. describes a cover substrate (180) having first and second surfaces

18. Further, Leslie et al. describes an alignment layer (155, 165) on the walls of the trench contacting the liquid crystal material for homogeneous alignment of the liquid crystal material (see Column 4).

19. Further, Leslie et al. describes the beam as linearly or circularly polarized (see Columns 5-6).

20. Leslie et al. does not describe the light beam having light of any polarization.

21. Clapp describes the apparatus having a waveguide switching element, as described above, including a light beam of any polarization.

22. Leslie et al. and Clapp are analogous art because they are from the same field of endeavor of light switching.

23. At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the liquid crystal material set up of Clapp within the overall trench and electrode structure of Leslie et al. to allow for switching of light beam with any light polarization. The motivation for doing so would have been to increase the usefulness of the Leslie et al. device by allowing a greater range of light beams to be used. Therefore, it would have been obvious to combine Clapp with Leslie et al. to obtain the invention as claimed in the current application.

Allowable Subject Matter

24. Claims 15-16, 19, 22 and 26-28, 30-31 and 36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

25. Claims 15-16 describe the first surface of the cover substrate contacting the waveguide surface. Claim 19 describes the alignment layer for homeotropic alignment of the liquid crystal material. Claims 22 and 26 describe the beam of light as randomly polarized. Claim 26 describes the waveguide with a curvature path for a beam in linear polarization. Claim 27 describes the waveguide with a curvature path for a beam in circular polarization. Claims 3q describe a pair of electrodes on the first surface of the cover substrate. Claim 36 describes electrodes on the walls of the trench.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry T. RahlI whose telephone number is (571) 272-2356. The examiner can normally be reached on M-Th (8:30-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jerry T. Rahll



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PRIMARY EXAMINER